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10 June 2004
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(54) Title: A METHOD FOR THE START-UP OF AN EPOXIDATION PROCESS AND A PROCESS FOR THE EPOXIDATION OF AN OLEFIN

(57) Abstract: A method for the start-up of a process for the epoxidation of an olefin, which method comprises contacting a catalyst bed comprising a silver-based highly selective epoxidation catalyst, or a precursor of the catalyst comprising the silver in cationic form, with a feed comprising oxygen at a temperature of the catalyst bed above 260 °C for a period of at most 150 hours, and subsequently decreasing the temperature of the catalyst bed to a value of at most 260 °C, and a process for the epoxidation of an olefin, which process comprises contacting a catalyst bed comprising a silver-based highly selective epoxidation catalyst, or a precursor of the catalyst comprising the silver in cationic form, with a feed comprising oxygen at a temperature of the catalyst bed above 260 °C for a period of at most 150 hours, and subsequently decreasing the temperature of the catalyst bed to a value of at most 260 °C and contacting the catalyst with the feed comprising the olefin and oxygen.

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INTERNATIONAL SEARCH REPORT

Inventor's Application No
PCT/US 03/20095

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C07D301/10

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C07D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 087 299 A (BAUM MATTHIAS ET AL) 11 July 2000 (2000-07-11) claim 1 column 7, lines 2-67 column 8, lines 46-54 examples 1-5	1-13
X	US 5 770 746 A (JEWSON JENNIFER D ET AL) 23 June 1998 (1998-06-23) claim 1 column 5, lines 61-64 column 7, lines 1-7 examples 1-10	1-6, 8-10, 12, 13
	-/-	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- *G* document member of the same patent family

Date of the actual completion of the international search

1 October 2003

Date of mailing of the international search report

20.02.2004

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Grassi, D

INTERNATIONAL SEARCH REPORT

I International Application No
PCT/US 03/20095

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 874 879 A (LAURITZEN ANN M ET AL) 17 October 1989 (1989-10-17) cited in the application example 1	1-13
X	US 4 766 105 A (LAURITZEN ANN M) 23 August 1988 (1988-08-23) cited in the application column 19, lines 23-43; claim 1	1-13
X	GB 1 170 663 A (SHELL) 12 November 1969 (1969-11-12) examples I-IV	1-13

INTERNATIONAL SEARCH REPORT

ational application No.
PCT/US 03/20095

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☒ Claims Nos.: 1, 10
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
see FURTHER INFORMATION sheet PCT/ISA/210
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1-13 (part)

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box I.2

Claims Nos.: 1,10

Present claims 1 and 10 relate to an extremely large number of possible methods. Support within the meaning of Article 6 PCT and/or disclosure within the meaning of Article 5 PCT is to be found, however, for only a very small proportion of the methods claimed. In the present case, the claims so lack support, and the application so lacks disclosure, that a meaningful search over the whole of the claimed scope is impossible. Consequently, the search has been carried out for those parts of the claims which appear to be supported and disclosed, namely those parts relating to the methods according to claim 2 where the catalyst is defined more specifically.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.5), should the problems which led to the Article 17(2) declaration be overcome.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-13(part)

Process in which ethylene is epoxidised (claim 7) in the presence of a silver catalyst comprising a Group IA metal and one or more dopants selected from Re, Mo and W (claim 2).

2. claims: 1-6,8-10,12,13(all part)

Process in which an aromatic olefin is epoxidised (page 10) in the presence of a silver catalyst comprising a Group IA metal and one or more dopants selected from Re, Mo and W (claim 2).

3. claims: 1-6,8-10,12,13(all part)

Process in which a di-olefin is epoxidised (page 10) in the presence of a silver catalyst comprising a Group IA metal and one or more dopants selected from Re, Mo and W (claim 2).

4. claims: 1-6,8-10,12,13(all part)

Process in which 1-butene, 2-butene or isobutene is epoxidised (page 10) in the presence of a silver catalyst comprising a Group IA metal and one or more dopants selected from Re, Mo and W (claim 2).

5. claims: 1-6,8-10,12,13(all part)

Process in which propylene is epoxidised (page 10) in the presence of a silver catalyst comprising a Group IA metal and one or more dopants selected from Re, Mo and W (claim 2).

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 03/20095

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